

REMARKS

Reconsideration of the application is requested in view of the modifications above and the remarks below. Applicants have cancelled Claim 9 and introduced new Claims 10-15. Support for the new claims is found in the originally filed claims.

1. Rejection Under 35 USC 103

The Office Action rejected Claim 9 under either EP 1077241 (EP' 241) or U.S. Pat. No. 6,471,735 (Misra). The Office Action referred to "Misra et al." and it appears that an inadvertent error was made and that "Misra et al" was the intended phrase.

The rejection should be withdrawn. It is well settled that to establish a *prima facie* case of obviousness, the USPTO must satisfy all of the following requirements. First, the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or to combine references. *In re Fine*, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Second, the proposed modification must have had a reasonable expectation of success, as determined from the vantage point of one of ordinary skill in the art at the time the invention was made. *Amgen v. Chugai Pharmaceutical Co.* 18 USPQ 2d 1016, 1023 (Fed Cir, 1991), *cert. denied* 502 U.S. 856 (1991). Third, the prior art reference or combination of references must teach or suggest all of the limitations of the claims. *In re Wilson*, 165 USPQ 494, 496, (CCPA 1970).

Applicants' invention relates to a method that polishes a composite material containing silica and silicon nitride with an acidic polishing slurry comprising (a) from about 0.1 to about 5%, by weight, of a colloidal silica abrasive, (b) from about 0.5 to about 10%, by weight, of a fluoride salt. The colloidal silica abrasive is present in a quantity ranging from about 0.1 to about 3.5% by weight and the fluoride salt is present in a quantity of from about 1 to about 6%, by weight. Also, the slurry has a pH ranging from about 2 to about 6. An object of Applicants' invention is to solve the problems of solutions found in the prior art and to provide an acidic, colloidal polishing slurry of the silica type for chemical-mechanical polishing with a

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high polishing selectivity in terms of the rate at which silica is removed compared to the rate at which silicon nitride is removed. (See page 4, first paragraph).

EP'241 teaches methods for making a slurry that is suitable for use in a chemical-mechanical planarization process. (See Abstract) Such methods involve combining (a) abrasive particles, (b) a suspension medium, (c) a peroxygen compound, (d) an etching agent, and (e) an alkyl ammonium hydroxide. (See Abstract).

One of ordinary skill in the art following the teachings of EP'241 would not have been motivated to modify EP'241 and practice Applicants' invention. EP'241's method of combining (a) abrasive particles, (b) a suspension medium, (c) a peroxygen compound, (d) an etching agent, and (e) an alkyl ammonium hydroxide would not have motivated one of ordinary skill in the art to modify such a method (or any of the other teachings found in EP'241), and practice a method that involves polishing a composite material containing silica and silicon nitride with an acidic polishing slurry comprising (a) from about 0.1 to about 5%, by weight, of a colloidal silica abrasive, (b) from about 0.5 to about 10%, by weight, of a fluoride salt, in which the colloidal silica abrasive is present in a quantity ranging from about 0.1 to about 3.5% by weight and the fluoride salt is present in a quantity of from about 1 to about 6%, by weight and the slurry has a pH ranging from about 2 to about 6. In other words, EP'241 does not contain teachings that would have motivated one of ordinary skill in the art to select the pH range encompassed by Applicants' invention.

Applicants' invention is based on the surprising discovery that using a higher amount of fluoride salt, like disclosed in working examples 1 and 2 of table 1, the results of a polishing mixture with a lower pH (3.8; Example 1) is even better than that of a mixture with a higher pH (5; Example 2). The selectivity is comparably high in the same order of magnitude. However, both examples show that the process is even better than the state of the art process. The specification shows on table 1 on page 8 that a polishing slurry without any fluoride salt (comparison example) will give the poorest results concerning the polishing rate (350 Angstrom/min) as well as the selectivity. The Examples evidence that the use of a polishing slurry of the colloidal silica type, as a result of a fluoride salt being added, has a much higher polishing

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selectivity in terms of the rate at which silica is removed compared to the rate at which silicon nitride is removed, than a conventional polishing slurry comprising pyrogenic silica. (See Specification, page 7, paragraph 2). In other words, one of ordinary skill in the art following the teachings of EP '241 would not have been motivated to modify EP '241 and practice Applicants' invention. Reconsideration is requested.

With respect to Misra, the rejection should also be withdrawn for similar reasons. Misra teaches a method for making a slurry composition suitable for use in a chemical-mechanical planarization process. The Misra method involves combining (a) abrasive particles; (b) a suspension medium; (c) a peroxygen compound; (d) an etching agent; and (e) an alkyl ammonium hydroxide. (See Summary of Invention). In another embodiment, Misra teaches a method for making a composition that is suitable for use in a chemical-mechanical planarization process where an abrasive planarizing surface is used. This method involves combining (a) a peroxygen compound; (b) an etching agent; and (c) an alkyl ammonium hydroxide. Reconsideration is requested.


Misra does not contain teachings as required under 35 USC 103. Misra does not teach to use fluoride salts in particular nor a specific pH range or value as Applicants' invention.

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In view of the foregoing amendments and remarks, allowance of the pending claims is earnestly requested.

Respectfully submitted,

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